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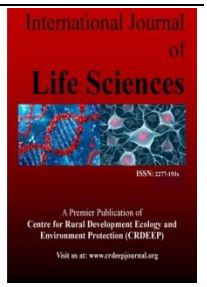

Full Length Research Paper

Nurses Clinical Competence in Assessment of Diabetic Patients in Selected Hospitals in Kisumu County, Kenya

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ABSTRACT

In nursing, clinical skills competence is a central issue for patient care and a clear understanding of the concept of assessing diabetic patients in various hospitals. According to World Health Organization (WHO) 2010 report, diabetes mellitus and its' complications affect 10% of adults globally, and it is estimated to become the seventh cause of death of adults by 2030. Diabetic complications do occur as a result of poor glycemic control, lack of optimal maintenance of glycemic control, constant stress levels and work pressures. Nurses' clinical assessment competence has been known to be the indicator in the assessment of diabetic patients who have the potential of developing complications. These complications can lead to an increase in morbidity, mortality rates and increased health care costs. This study determined the nurses' clinical competence in assessing diabetic patients. A cross sectional quantitative study design was used; study population involved 96 nurses working in the medical wards, surgical wards and diabetic clinics of selected hospitals. Simple random sampling method and probability proportional allocation was used. Diabetic self-assessment questionnaire and an observation checklist were used to collect data. The instruments were piloted before administration to establish their validity and reliability. Data analysis was done using specific tests according to variables as guided by the objective. Descriptive statistics yielded frequencies and percentages. Chi square was used to show the relationship between variables. There was a strong relationship between the nurses' knowledge, education levels, experience and their ability to assess and identify patient needs and prevent diabetic complications. Majority of the nurses had knowledge on the nature and scope of diabetes mellitus and were able to assess patients to prevent diabetic complications. Only 40 (41.6%) nurses were able to explain how stress affects diabetes. Years of experience, level of education, work environment and institutional management influenced the nursing competencies in assessment of diabetic patients. Fifty six (58.3%) nurses did not have knowledge on Glycosylated Hemoglobin test (HBA1C) and could not perform the test. ***Conclusion:*** *Based on the results the study recommends that nurses be educated on the effect of stress on diabetes mellitus, specialized training for practicing clinical nurses on assessing diabetic patients and Glycosylated Hemoglobin test in glycemic control.*

Introduction

Health care is changing rapidly with the demand to create more collaborative working environments, keep pace with demographic pressures and meet complex care needs for diabetic patients in both public and private sectors. Nurses' clinical competence in assessing patients would work towards meeting patient care expectations (Ham *et al* 2012). In addition, clinical nurses must make decisions about patient care based on the most up-to-date evidence and best practice, and should consider the assessment of diabetic patients' lifestyles and any comorbidities (Benner *et al* 2010), and appropriate timing of an intervention and patient referral (National Institute for Health and Care Excellence (NICE) 2014).

Diabetes is one of the four priority's Non Communicable Diseases (NCD) and has become an important public health problem. Globally an estimated 422 million adults were living with diabetes in 2014 compared to 108 million people in

1980.This indicates a rise from 4.7% in 1980 to 8.5% currently in the adult population (WHO, 2016).

In 2012 diabetes caused 1.5 million deaths by the increased risks of cardiovascular diseases and other complications. Diabetes of all types can cause multi organ complications to include heart attack, kidney failure, leg amputation, vision loss and nerve damage. Poorly controlled diabetes in pregnancy increases the risks of fetal death. Economically, people with diabetes, their families and the health sector system bear huge economic losses, contributed by costs related to treatment of diabetic complications such as retinopathy, nephropathy and hospitalizations (WHO, 2016).

Clinical competence of practicing nurses is important in maintaining professional standards, identifying areas of professional development and education needs of the nurses, and ensuring that nurse competencies are put to the best and possible use in patient care when assessing diabetic patients. Clinical competence includes; knowledge, attitude and practice of the nurse in assessment of diabetic patients (WHO, 2014).

Nursing clinical assessment is a systematic and continuous collection, organization, validation and documentation of patient information (Berman, 2010).It is the process by which the nurse and patient together identify needs and concerns, and it is seen as the cornerstone of individualized care, a way in which the uniqueness of each patient can be recognized and considered in the care process (Berman et al, 2010). Berman continues to say that it is a deliberate and interactive process that underpins every aspect of nursing care to patients at risk of developing complications from a given disease condition.

Alfaro (2014) argues that nursing clinical competency is an integral component of the nurse's role and responsibility, while providing safe and planned care to assigned patients. Expertise in clinical patient assessment comes from using a systematic approach, regular practice and receiving feedback on completing nursing clinical assessments (Alfaro, 2014).

According to (Berman *et al* (2010), patient clinical assessment is highly interdependent with the nurse's knowledge of commonly occurring health challenges as far as the nurses' clinical competency in assessing diabetic patients is concerned. Berman (2010) further asserts that, if assessment proves to be challenging it is important to analyze whether the source of the difficulty rests with assessment or clinical competency related to commonly occurring health challenges (Berman , 2010).

Nurses' clinical competence with regard to diabetic patient assessment should ensure that the nurses demonstrate clinical knowledge, reasoning and skills in diabetic nursing without any assistance or direct supervision (Munroe *et al;* 2013).

Patients with diabetes frequently attend clinics or visit the hospital to consult their healthcare practitioners, either specifically for diabetes-related issues, for complications of their chronic illness, or for unrelated problems. They may see their consultants, practice nurse, hospital diabetologist, diabetes specialist nurse, dietician and many others, from time to time. Each visit can be viewed as an opportunity to assess and improve the patient's understanding of their illness, and their ability to control the disease (ADA, 2015).Dunkley (2014) states that ADA guideline recommendations on intervention content and delivery are significantly associated with improved glycemic control. Healthcare providers and nurses need to adhere to specific clinical diabetes guidelines when caring for these patients in the hospital setting (ADA, 2015).

The aim of assessing diabetic patients is to educate the patient and enable them to monitor and manage their diabetes as well as possible.To assess any problems in glycemic control and address them to improve, detect any complications of diabetes and treat them as appropriate. To educate and reinforce healthy lifestyle advice and assess the patient's overall health and treat any associated or coincidental illness, physical or mental.This aims at the provision of support and advice to the patient on how to cope with living with a chronic illness and how they can best alter their lifestyle to maintain their health (Dunkley, 2014).

According to Howlin & Benner (2010), competent nursing clinical assessment for diabetic patients is part of a day to day clinical practice. Clinical competence, timely and comprehensive patient assessment provides the foundation to determining the plan of care for diabetic patients (Howlin, 2010). Benner (2010) denoted that clinical competence in nursing assessment of diabetic patients is critical in the prevention of diabetic complications. Nurses play a key role to identify diabetic patients at risk and intervene at an earlier stage and improve outcome for patients with diabetes mellitus (WHO, 2010). In Kisumu County (Kenya), there is a rise in the number of patients with diabetes mellitus accounting to 2% of deaths (WHO, 2012).Limited studies have been done on clinical competence for nurses on assessing diabetic patients.

Therefore, it is against this background that the study aims at determining the clinical competence of nurses in assessment of diabetic patients in selected hospitals in Kisumu County. The main objective of this study was to determine the nurse'clinical competence in assessment of diabetic patients in selected hospitals in Kisumu County.

Materials and methods

The study was conducted in both public and private hospitals in Kisumu County in the western region of Kenya. These hospitals were: Jaramogi Oginga Odinga Teaching and Referral Hospital (JOORTH), Kisumu County Hospital (KCH), Ahero Sub County Hospital (ASCH), The Aga Khan Hospital Kisumu (AKHK) and Avenue Health Care Hospital (AHC).Piloting was done in Oasis hospital which is a different hospital other than the hospitals included in the study. Notable hospitals in Kisumu County include Jaramogi Oginga Odinga Teaching and Referral Hospital, Kisumu County Hospital, The Aga Khan Hospital Kisumu and Avenue Health Care Hospital in Kisumu.

Research Design

A descriptive cross sectional design that employed quantitave approach was used in the study. Data was collected from nurses on nurses' clinical competence in assessment of diabetic patients to prevent diabetic complications.

Target Population

This comprised of nurses who are working in medical-surgical wards and diabetic clinics of selected hospitals.

Inclusion Criteria

Nurses who agreed to participate in the study, both male and female, those who had signed the informed consent and were working in the medical, surgical wards and diabetic clinic at the time of data collection.

Exclusion Criteria

Nurses without diploma certificates and bachelor's degree levels, nurses who did not agree to participate in the study and nurses who did not sign the informed consent.

Sample Size Determination Calculation

Sample Size calculation was done using Fishers method of the total target population of nurses working in the medical, surgical wards and diabetic clinics. Given that the proportion of the population having the required characteristics is estimated at 50% (p=0.5) the sample size was determined using the following formula Mugenda, (2003). $n=Z^2pq/n$ where:

z = the standard normal deviate at the required confidence level at 95% (equivalent to 1.96)

p = the proportion in the target population estimated to have characteristics being

measured. q = 1-p, d = the level of statistical significance set at + or – 5% or 0.05

Since the target population is less than 10,000, the final sample estimate (nf) will be calculated as follows (Fisher *et al.,*1983): nf=n/1+n/N

Where: nf = the desired sample size (when the population is less than 10,000).

N = the estimate of the of the population size which is 112

In this study the proportion of the target population with a certain characteristic is 50, the z-statistic is 1.96, and the error risk assuming 95% CI is 0.05 therefore, the sample size is:

$$n = \frac{(1.96)^2_{(0.5)\ (0.5)}}{(0.05)^2}$$

n=384

Therefore n=384 divide by 1+n/estimate of the population

nf=384/1+384/112

nf=384/1+3.4

nf=384/4.4

nf=87

10% of the population was selected to cater for non-response rates. This was 10% of 87 that gave 9 participants. Therefore the sample size became 96.

Since the respondents were drawn from diverse working hospital environments it was believed that they would provide rich and helpful data. The researcher sought permission to conduct the study in the identified hospitals. The researcher then obtained the nurses' consent for participation in the study after giving full information about the study and clarifying all issues of concern to the respondents. This was done through signing the informed consent forms.

Sampling Procedure

Kisumu County has both public and private hospitals according to levels, from this 3 of the 9 public hospitals were picked using simple random sampling method. These hospitals were: Jaramogi Oginga Odinga Teaching and Referral Hospital (JOOTRH), Kisumu County Hospital (KCH), Ahero Sub County Hospital (ASCH), The Aga Khan Hospital Kisumu (AKHK) and Avenue Health Care Hospital (AHCH). This selection involved 3 public and 2 private hospitals due to the levels or tiers within the county. The total number of nurses in the sampled hospitals was 112. Total sample as determined was 96 and the research included simple random sampling method and proportionate allocation to pick nurses from selected hospitals under study as follows:

Table- 1 List of Hospitals visited and Sample Size Calculation

Public Hospitals	**Total number of Nurses in the study areas**	**Sample size**
JOORTH	40	96/112*40=34
KCH	20	96/112*20=17
Ahero Sub County Hospital	2	96/112*2=2
Private Hospitals		
The Aga Khan Hospital	30	96/112*30=26
Avenue Health Care	20	96/112*20=17
Total	112	96

In simple Random Sampling each nurse had an equal chance of being selected in the sample. Using the sampling unit as shown in table 1, randomness is assured by a sampling procedure, where Yes and No was written down on small papers of uniform size where the nurses were to choose from. The papers were mixed well in a small container and the required slips were picked by the nurses at random. Those who choose the papers written Yes formed the representative sample given the proportion of the study participants expected from a given study area.

Nurses who were present on the selected wards were asked to complete a diabetic self-assessment report tool after signing the consent form. No internet or reference materials were allowed in the wards, this ensured that the nurses did not seek external assistance to answer the questions. A research assistant, who utilized the checklist, observed two to three nurses on shift in each ward under study. The research assistants had not previously interacted with the nurses, and the nurses did not know that they were being observed. This helped in minimizing changes the staff could do in their usual routine care if they knew

that they were being observed. The finding from the nurses on how they assessed patients and their practice was also noted down.

Development of Research Instrument

To collect data in this research a diabetic self-assessment questionnaire was used. The questionnaire administered was organized in the following sections: socio demographic characteristics, knowledge on the nature and scope of diabetes and nurses' clinical competence in assessment of diabetic patients. An observation checklist was administered by the research assistants. The research assistants who were nurses working in the study areas had been trained on how to conduct the observation. Research assistants observed how the nurses conducted the assessments on diabetic patients, without them realizing that they were being observed. All the research tools were piloted in a different hospital other than the hospitals identified in the study to ascertain their validity and reliability in the study.

Pre-test of Research Instrument

Pretest refers to a trial administration of an instrument to identify flaws. When a study tool is used as a data gathering instrument, it is used to determine whether questions and directions are clear to study participants and whether they understand what is required from them. The diabetic self-report tool was piloted in Oasis hospital, a different hospital other than the ones identified for the study. A pilot study was conducted to clarify instructions, check the appropriateness of the language used in the research instruments and to determine the difficulty of the items in the instruments in order to make adjustments in the study tool.

However before the study some precautions were taken into consideration to include: First and foremost, short, clear and straightforward questions in order to eliminate ambiguity. Secondly, the researcher had a discussion with the nurses prior to presentation of the tool on the purpose of the study. This was to motivate the nurses to own up to the process by filling in the items required in the tool.

Validity of the Instrument

This was ensured by providing a pretested diabetic self-reported questionnaire with the statements based on the content from the literature review and the study objective.

Reliability of the Instrument

This was achieved by consistency in the administration of the research tool during data collection period and on individual basis.

Data Collection Tool

Data was collected using participant observation checklist, and a diabetic self-administered questionnaire. The tool was administered to the nurses who were working in the medical, surgical wards and diabetic clinics of the selected hospitals identified for study. The tools were personally distributed by the researcher and her assistants to the nurses. The questionnaire had parameters which were to explore the study participants' knowledge, and nurses' clinical competence in assessment of diabetic patients admitted in medical and surgical wards, and clients attending the diabetic clinics. Data collection started with self-introduction and overview of the research including the study objective. Explanations were given to respondents as required and the questionnaires were administered after signing the consent form. The participant observation checklist was used by the researcher and research assistants.

Data Quality Control

The questionnaires were pre tested and research assistants were trained for two days on the objectives of the study, sampling procedure and checking the completeness of questionnaires. Furthermore data were checked during entry into the computer before analysis.

Data Analysis

Quantitative data were coded, and entered in a statistical computer package SPSS version 20.0 data were edited for errors and corrected accordingly. Data were analyzed using specific tests depending on the variables. Descriptive statistics generated frequencies, and percentages. Inferential statistics such as chi-square, Cramer's V and correlation coefficients were done to test the strength of relationships between the variables to include age, education level, gender, competency, knowledge, assessment, factors influencing competency, diabetic complications, nursing assessment and exercise. Data analysis was done as per the objective. Analyzed data were presented in tables. Data security was ensured by use of passwords kept by the investigator only.

Ethical Consideration

Prior to conducting the study, approval was sought from the Institutional Ethical Review Committee (IERC) of the University of Masinde Muliro of Science and Technology, where logistical and ethical considerations were included, as well as from the executive administrative team at the facilities in which the study was conducted. In compliance with the outlined regulations brought forth by the facility, the principal investigator provided contact information to each nurse participant in lieu of questions regarding participation in the study. The participants were assured of anonymity in joining the study; they were also informed of it's voluntary to participate and that there was no penalty for those not willing to participate.

The researcher avoided strategies that would compromise the nurses' values or put them at risk. Informed consent and maintaining confidentiality were the ethical issues considered in this study. The researcher accurately represented what the nurses reported without biases.

Informed Consent

Consent refers to the process of giving respondents an opportunity to decide whether to participate in a particular study or not. Adequate information and opportunity to enquire was availed before nurses were asked to fill in the informed consent forms. The respondents in this study were nurses working in the medical, surgical and diabetic clinics. The nurses were given all the relevant information about the study that was to be undertaken. This was important for the nurses to give consent without coercion, pressure or undue enticement. The researcher ensured that the nurses' anonymity was maintained, and this was to allow them to choose to either participate in the study or not.

Confidentiality
The material and information provided by the respondents would be destroyed upon completion of the study period to protect their confidentiality. The researcher had no intention whatsoever to use the nurses' names in any publication.

Privacy
This was safeguarded where no disclosure of information was done by researchers to others at any point during the study. No identification of nurses involved in the study was done during data collection and coding was done during this time.

Beneficence
In this study the registered nurses involved were given information on what the study was about and a debriefing after the study. This gave the nurses involved in the study room to ask questions and clarifications about the study. This ensured that the risks incurred will not be greater than the normal.

Non maleficence
This would entail the duty to benefit others and prevent any harm in the study.

Justice
In this research fairness and equity was observed, where a procedure of selecting registered nurses to be involved in the study was done using an inclusive criteria.

Results

Respondents Response Rate
The diabetic self-administered questionnaire was administered to the nurses who worked in surgical and medical wards during the study period. A total of 96 diabetic self-administered questionnaires were completely filled which gave 100% response rate. The response rate was sufficient and representative and conforms to Mugenda and Mugenda (2003), stipulating that a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and above is excellent. Thus, a response rate of 100% was fit and reliable for the study.

Distribution of Demographic Characteristics of the Respondents
This section sought to identify the demographic information of the respondents including gender, age, years of experience in nursing in the organization and the level of education. These characteristics are important because they are known to influence the variables in a given study. The gender of the nurses should be an important consideration since diabetic patients who have complications could prefer sharing with persons of same gender e.g. erectile dysfunction. The profession and working period of the nurses in the clinics and wards in the hospitals was important to determine their area of specialization, qualifications and competences' to manage patients with diabetes mellitus. The general information points at the respondents' suitability in answering the questions and vast awareness on management and control of diabetes mellitus complications.

Table- 2 Demographic Characteristics of the Respondents

Characteristic	Number	%
Age in Years		
25-29	22	22.9
30-34	13	13.5
35-39	28	29.2
40-44	25	26.1
45-49	8	8.3
Total	**96**	**100**
Gender		
Male	39	40.6
Female	57	59.4
Total	**96**	**100**
Level of Education		
Diploma	58	60.5
Bachelor's Degree	38	39.5
Total	**96**	**100**
Years of Nursing Experience		
1-5	20	20.8
6-10	32	33.4
Over 10 years	44	45.8
Total	**96**	**100**

A total of 96 nurses participated in the study, 35 (36.4%) nurses were at the age of 25 to 35 years and 61 (63.6%) nurses were aged between 35 to 49 years. Among the respondents 57 (59.4%) were females and 39 (40.6%) were males of the total population. On education level, 58(60.5%) nurses were diploma holders compared to bachelors' degree holders who accounted for 38(39.5%).On working experience 44(45.8%) nurses of the study population had over 10 years of experience, 32 (33.3%) 6 to 10years and 20 (20.8%) less than 5 years of experience.

Nurses' Clinical Competence in Assessment of Diabetic Patients
Eighty six (89.6%) nurses involved in the study were competent in giving instructions to diabetic patients on self-care

management of a sick day. Only 10 (10.4%) nurses could not competently instruct. A total 84 (87.5%) nurses competently described the effect of insulin administration to diabetic patients and only 12(12.5%) nurses could not competently describe the effects of insulin administration. From the total number of nurses involved in the study 56 (58.3%) nurses could not competently explain how stress affects diabetic control. Only 40 (41.6%) nurses competently explained how stress affects diabetic control to diabetic patients. Ninety two (95.8%) nurses competently adviced diabetic patients on personal care. Only 4 (4.2%) did not competently advice diabetic patients on personal care while managing the problem. A total of 92(95.8%) nurses involved in the study had the knowledge of how early detection and screening services would reduce diabetic complications and were competent, only 4(4.2%) nurses were incompetent on how early detection and screening services would reduce diabetic complications.

Table 3, has shown that 93(96.9%) nurses involved in the study would competently identify how lifestyle modifications like frequent exercises, proper dietary intake, cessation of smoking and alcohol consumption is essential in the management and control of diabetic complications. Eighty (83.3%) nurses competently taught diabetic patients on self-administration of insulin especially patients with type 1 diabetes, only 16(16.7%) nurses could not competently teach the diabetic patients on self-administration of insulin. From the study 90(93.8%) nurses competently offered counseling and health education to diabetic patients on the various types of diabetes mellitus, only 6(6.25%) nurses did not competently offer counseling and health education to diabetic patients on the various types of diabetes mellitus. Ninety(93.8%) of the nurses in the study had competent knowledge and skills on good management of diabetes mellitus that reduces complications related to the disease, only 6(6.25%) did not have competent knowledge and skills in the management of diabetes mellitus in the reduction of its complications. Majority of the nurses' competently adviced patients on the importance of follow up care.

Table- 3 Nurses' clinical competence in assessment of diabetic patients

	Objective Two Questions	Competent	Not competent	Total
1	Patient education on self-care management instructions of a "sick day"	86	10	96
2	Instructions on action and effect of insulin administration	84	12	96
3	Explanation on how stress affects diabetes control	40	56	96
4	Instructions on daily personal care diabetic patients	92	4	96
5	Screening services instructions to reduce diabetic complications	92	4	96
6.	Lifestyle modification instructions to diabetic patients	93	3	96
7	Teaching and demonstration on self-administration of insulin	80	16	96
8	Counseling and health education on the various types of diabetes mellitus	90	6	96
9	Advice on diabetes mellitus complications	90	6	96
10	Advice on follow-up care for diabetic patients	88	8	96

Use of a Glucometer for blood Glucose monitoring and Education Level of the Nurse

From table 4 study findings on the use of a glucometer for blood glucose monitoring shows that 91 nurses both bachelors degree 37 (97.4%) and diploma holders 54(93.1%) competently used a glucometer to monitor blood sugar for diabetic patients. Only 5 (5.2%) nurses of the total nurses involved in the study could not competently use a glucometer to monitor blood sugar for patients with diabetes.

According to key informants from the institutions on how the nurses were assessed for competency, one of them said that the clinical nurse instructor who is the head nurse in the study areas checked her nurses' skills on blood glucose monitoring using an glucometer machine on monthly basis and thus he or she develops their skills while attending to diabetic patients. This feedback was also given immediately after identifying any gaps and it was part of staff development process in those study areas.

Table -4: Use of a Glucometer for blood Glucose monitoring and Education Level of the Nurse

Education Level	Competent	Not competent	Total
Diploma	54(93.1%)	4(6.9%)	58
Bachelors Degree	37(97.4%)	1(2.6%)	38
Total	91	5	96

Nurses' clinical assessment of a diabetic hypo/hyperglycemic patient experiencing loss of consciousness and education level of the nurses

From table 5 findings show that nurses who had a bachelor's degree 37(97.4%) could competently perform the nursing assessment of a patient with diabetes experiencing loss of consciousness compared to nurses with diploma holders 49(84.5%%) and only 10(10.4%) of the total nurses could not competently assess a diabetic patient experiencing loss of consciousness. This shows that there is a relationship between nursing care and education level of the nurses.

Table-- 5: Nurses' clinical assessment of a diabetic hypo/hyperglycemic patient experiencing loss of consciousness and education level of the nurses

	Diabetic hypo/hyperglycemic		
Education Level	Competent	Not competent	Total
Diploma	49(84.5%)	9(15.5%)	58
Bachelors Degree	37(97.4%)	1(2.6%)	38
Total	86	10	96

Clinical Competence Assessments in the prevention of Diabetic Complications

Clinical competence assessments done during the study were: nutritional, vascular, self-care, risk, eye assessment, renal assessment, foot assessment, neurological and cardiovascular complication assessment. All this was incorporated in the questionnaire. Table 6 indicates that 76(79.2%) nurses involved in the study competently assessed a patient with diabetes going to the operating room to include; blood sugar check before surgery, use of hypoglycemic drugs and insulin before surgery. Only 20(20.8%) nurses could not competently do the assessment. Ninety (93.8%) nurses competently managed a patient who experienced mild hypoglycemia by checking blood sugar and providing a quick intervention on glycemic control, only 6(6.25%) could not competently assess the nursing needs of a patient experiencing hypoglycemia. Among the nurses involved in the study and who could competently manage the nursing assessment of a patient with diabetes experiencing loss of consciousness by checking blood sugar, taking of vital signs and provide early intervention to prevent complication were 86(89.6%) and only 10(10.4%) could not competently assess and manage a patient experiencing loss of consciousness. Eighty five registered nurses (88.5%) could competently assess for the development of diabetic complications to include foot, hypoglycemia and hyperglycemia. only 11(11.5%) could not competently assess. The nurses who could competently assess the diet recommended for a patient with diabetes mellitus like sugar free, portion of food and a balanced diet rich in green vegetables were 91(94.8%) and only 5(5.2%) of the total nurses could competently assess.. Ninety one (94.8%) nurses in the study could competently do a blood sugar check and monitoring like daily use of glucometer machine to know the sugar level of a diabetic patient, only 5(5.2%) nurses could not competently use a glucometer for blood sugar monitoring. Nurses who could competently assess the three sites for insulin administration to include lower abdomen, lateral aspect of the thighs and deltoid muscle, were 91(94.8%), only 5(5.2%) nurses could competently assess. From the total number of nurses who participated in the study, 88(91.7%) could competently do a nursing assessment for a patient with diabetes experiencing hyperglycemia without ketosis, only 8(8.3%) nurses could not competently manage. Table 6 has shown that, 91(94.8%) of the nurses involved in the study could competently assess the signs and symptoms of hypoglycemia and hyperglycemia and only 5(5.2%) nurses could not competently assess the signs of hypoglycemia and hyperglycemia which are the common diabetic complications. Finally 92(95.8%) nurses could competently do a general and focused assessment on diabetic patients admitted to the wards or attending clinics to prevent the onset of complications and only 4(4.2%) nurses could not competently assess a patient to prevent the onset of diabetic complication.

Table- 6 Nurses' Clinical Competence Assessments in the prevention of Diabetic Complications

	Clinical competencies	Competent	Not competent	Total/percentage
1	Preoperative nursing	76(79.2%)	20(20.8%)	96(100%)
2	Assessing hypoglycemia	90(93.8%)	6(6.2%)	96(100%)
3	Neurologic assessment	86(89.6%)	10(10.4%)	96(100%)
4	Diabetic complications assessment	85(88.5%)	11(11.5%)	96(100%)
5	Nutritional assessment	91(94.8%)	5(5.2%)	96(100%)
6	Blood sugar check monitoring method	91(94.8%)	5(5.2%)	96(100%)
7	Assessing sites for insulin administration	91(94.8%)	5(5.2%)	96(100%)
8	Hyperglycemia without ketosis assessment	88(91.7%)	8(8.3%)	96(100%)
9	Hyperglycemia signs and symptoms	91(94.8%)	5(5.2%)	96(100%)
10	General and focused assessment	92(95.8%)	4(4.2%)	96(100%)

Use of a Glucometer for blood glucose monitoring and education level

Findings from Table 7 have shown that nurses who had bachelor's degree 37(97.4%) would competently use a glucometer for blood glucose monitoring compared to diploma holders 54(93.1%) , and out of this only 5(4.4%) of the total nurses with bachelors and diploma holders could not competently use a glucometer for glucose monitoring.A further test done by chi-square and cramers' V showed that, there was a significant relationship between performance of blood glucose monitoring and the level of education. (χ^2=52.208 p=0.00; Cramers' V value 0.498).

Table- 7: Use of a Glucometer for blood glucose monitoring and education level

	Glucometer use for glucose monitoring		
Education Level	Competent	Not competent	Total
Diploma	54(93.1%)	4(6.9%)	58
Bachelors Degree	37(97.4%)	1(2.6%)	38
Total	91	5	96

χ^2=52.208 p=0.000

3.9 Assessing sites for insulin administration and education level of the nurse

Nurses who had a bachelor's degree 38(100%) competently assessed the sites for insulin administration compared to 53(91.4%) nurses with diploma. Only 5(8.6%) of the diploma holder nurses could not competently identify and assess the sites for insulin administration. Of those who could not identify the three sites of insulin administration were nurses with diploma holders. Therefore there is a strong significant relationship or association between the level of education and identification of three sites of insulin administration (χ^2=27.737 p<0.00; Cramers' V 0.530). According to the focus group discussion done with heads of departments on areas under study, on how they assessed their nurses on diabetic assessment that included identification of sites for insulin administration, feedback was that on any given day one nurse was allocated to do the assessment on one patient, check on diabetic care, including equipment check for blood sugar monitoring while on shift, while this was done the rest of the nurses could learn and any gap identified clarified at that time. This was a routine in some areas under study where quality was highly observed according to the standards set in that institution. The results from the skill check done on this nurses was documented in their personal files as evidence of training undertaken within the institution .Some said that this are key indicators as far as diabetic assessment was concerned in the institution. This was an indicator of competency assessment for the nurses' knowledge as translated to practice. Another head nurse said that, as part of the nurses' continuous education nurses need skill checks done quarterly and this has shown a lot of improvement on the nurses' knowledge, skills and practice. Diabetic assessment starts from admission of a patient till discharge and follow up care, this comment came up from one of the heads of department in the outpatient clinic

Table- 8: Assessing sites for insulin administration and education level of the nurse

	Assessing sites for insulin administration		
Education Level	Competent assessment	Incompetent assessment	Total
Diploma	53(91.4%)	5(8.6%)	58
Bachelor's Degree	38(100%)	0(0%)	38
Total	91	5	96

χ^2=27.737 p<0.000

Discussion

Nurses' Clinical Competence in the Assessment of Diabetic Patients

Study findings on nurses' competence has shown that, 91(94.8%) nurses involved in the study could competently assess for the signs and symptoms of hypoglycemia and hyperglycemia and only 5(5.2%) nurses could not competently assess the signs of hypoglycemia and hyperglycemia which are the common diabetic complications. Finally 92(95.8%) nurses could competently do a general and focused clinical assessment on diabetic patients admitted to the wards or attending clinics to prevent the onset of complications and only 4(4.2%) nurses could not competently assess a diabetic patient to prevent the onset of diabetic complication (χ^2=36.084 p<0.00).

This result on clinical competence on assessing diabetic patients has shown that there is a strong relationship between nurses' years of experience, education level and competence in assessing diabetic patients and early prevention of both short term and long term complications.

This study indicates that nurses in Kisumu County's' selected hospitals; were competent and knowledgeable in the clinical competence assessment. The nurses provided information, counseling and dissemination of health education to the patients on individuals and groups on a weekly basis. The nurses had the ability to detect, diabetes related complications based on the clinic observations and records. Thus, findings have shown that nurses' education, competency and practical skills play a major role in the management of diabetic complications in diabetes mellitus. This result concur with a study done in Hawassa University (South Ethiopia) in 2015.The results revealed that nurses' competency from a study of 87(25.2%) participants was 4 times clinically competent since they had adequate clinical practice than those nurses with inadequate clinical practice. This result concurred with the diabetic competency framework 2010 UK guidelines that state that, for a competent diabetic care provider competency is as per the guidelines. It further stated that a growing number of practice nurses provide a high-level of diabetes care in their practice population. The role of the practice nurse at this level encompasses direct referral, assessment, care planning, teaching and clinical skills (WHO, 2010).

The guideline further states that practice nurses delivering high-level diabetes care should have:completed an accredited training course in diabetes care at the diploma level or higher,undertaken an accredited training program in the initiation and management of insulin,a minimum of 2 years' experience in the practice environment (WHO, 2010). Therefore nurses' competency influences patient assessment, management and control of diabetic complications (WHO, 2010).

Another study done at the Kenyatta National Hospital, on clinical care of diabetes by health care workers, adherence to diabetes guidelines by healthcare professionals at the hospital was poor, and this could worsen during patients' subsequent visits. Poor adherence to annual risk assessment was also identified representing lost opportunity for early detection of preventable complications (Atieno, 2014).The findings found a gap that called for the health workers competences, availability and reasons for non-adherence to processes to be investigated. This study results were contrary to the current study findings.

Conclusion

This study focused on nurses 'clinical competence in assessment of diabetic patients in selected hospitals in Kisumu County. Majority of the nurses had knowledge on the nature and scope of diabetes mellitus and were able to assess patients to prevent diabetic complications. Only 40 (41.6%) nurses were able to

explain how stress affects diabetes. Years of experience and level of education influenced the nursing competencies in assessment of diabetic patients. 56(58.3%) nurses did not have knowledge on Glycated Hemoglobin (HBA1C) and could not perform the test.

Recommendations

- Registered nurses be educated on the effect of stress on diabetes mellitus.
- Additional specialized training for practicing nurses, on Glycated Hemoglobin test in glycemic control for diabetic patients
- Further studies to be done in other counties.

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